



(19)

JAPANESE PATENT OFFICE

PATENT ABSTRACTS OF JAPAN

(11) Publication number: 2002364091 A

(43) Date of publication of application: 18.12.2002

(51) Int. Cl. E04B 1/70
E04B 2/56

(21) Application number: 2001172325
(22) Date of filing: 07.06.2001

(71) Applicant: NIPPON PAPER INDUSTRIES CO
LTD
PAL CO LTD
(72) Inventor: TORIYAMA HIDEOKI

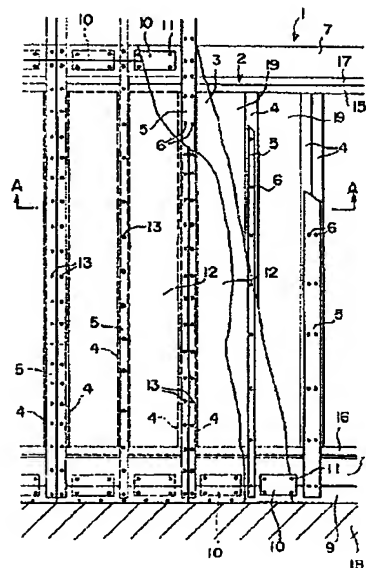
(54) OUTER WALL STRUCTURE

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(57) Abstract:

PROBLEM TO BE SOLVED: To provide an outer wall structure which sets the vapor release speed in a wall body to a large value to improve condensation preventing effect, is excellent in strength, maintains airtightness in a room, and is low in production cost.

SOLUTION: The outer wall structure is constructed according to a wood frame construction method with a venting construction method applied thereto. According to the outer wall structure, a frame wall 2 is erected, which has a waterproof vapor-permeable sheet 3 stuck to an outside thereof, and a venting corbel 5 of a predetermined size, formed of a woody laminate which is obtained by laminating and bonding woody veneers together, is mounted on vertical frames (studs) 4 of the frame wall 2 from above the waterproof vapor-permeable sheet 3. Then, an outer wall panel 12 is stuck to the venting corbel 5, and a vent passage 14 is defined between the outer wall panel 12 and the waterproof vapor-permeable sheet 3.



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CLAIMS

[Claim(s)]

[Claim 1] Are the outer wall structure by the framework wall method of construction which gave the aeration method of structure, and a waterproofing moisture-permeable plastic sheet is stuck on the outside of said framework wall. The corbel for aeration of the predetermined magnitude which consists of a woody laminated wood obtained from on this waterproofing moisture-permeable plastic sheet by carrying out laminating adhesion of the woody veneer by the door post of said framework wall is attached. Outer wall structure characterized by an outer wall panel being stuck on this corbel for aeration, and coming to prepare an aeration way between this outer wall panel and said waterproofing moisture-permeable plastic sheet.

[Claim 2] Outer wall structure characterized by being the plywood which said woody laminated wood made the grain direction of said woody veneer intersect perpendicularly mutually, and carried out two or more sheet laminating adhesion in outer wall structure according to claim 1.

[Claim 3] Outer wall structure characterized by being the parallel plywood to which at least one sheet made other woody veneer layers and the grain direction of said woody veneer cross at right angles among the woody veneers which constitute this parallel plywood with the parallel plywood which said woody laminated wood paralleled the grain direction of said woody veneer mutually, and carried out two or more sheet laminating adhesion in outer wall structure according to claim 1.

[Claim 4] Outer wall structure characterized by the thickness of said woody laminated wood being 7-30mm in outer wall structure according to claim 2 or 3.

[Claim 5] The part or all the door posts in the door post which opens predetermined spacing in said framework wall, and is prepared in it in the outer wall structure of a publication 4 either install two or more, and it is constituted. claim 1 thru/or a claim -- It is the outer wall structure which said corbel for aeration is attached so that this each door post constituted by installing two or more may be straddled, and is characterized by sticking said outer wall panel so that the joint may be located within the limits of the width of face of said corbel for aeration.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the outer wall structure which has endurance with a wall scale factor big moreover in the interior of an outer wall about the outer wall structure by the framework wall method of construction which gave the aeration method of structure which prevents that dew condensation occurs.

[0002]

[Description of the Prior Art] As outer wall structure of the conventional wooden residence by the framework wall method of construction (two-by-four construction) which gave the aeration method of structure which prevents that dew condensation occurs inside an outer wall, as shown in drawing 3 On the outdoor side side face of the door post (stud) 52 of the framework wall 51, boards, structural plywood, etc. as a sheeting 53, such as OSB, are stuck. Although it lets moisture pass on it, moisture is covered with the waterproofing moisture-permeable plastic sheet 54 which it does not let pass. From the waterproofing moisture-permeable plastic sheet 54 The corbel 55 for aeration which consists of Aphananthe aspera material is attached, the outer wall panels 56, such as siding, are stuck on this corbel 55 for aeration, and the structure which formed the aeration way 57 between this outer wall panel 56 and said waterproofing moisture-permeable plastic sheet 54 is known.

[0003] However, with such outer wall structure, since moisture permeation resistance of the sheetings 53, such as boards and structural plywood, was strong, the emission rate of the steam in a wall was slow, and, for this reason, the trouble that there was fear of dew condensation occurring or wall structural members, such as framework material, dilapidating for moisture was in the wall.

[0004] Then, in JP,5-5331,A and JP,5-280110,A, the thing of substrate structural plywood for which an air hole is suitably prepared in a part, moisture is emitted, and generating of dew condensation is prevented is indicated in order to solve this.

[0005] Moreover, according to JP,7-13918,U, wall surface substrate material being attached in the interior-of-a-room side of the perpendicular member of a framework wall through a spacer, forming the clearance for aeration between an outer wall sheeting and the interior-of-a-room side side face of the horizontal bracing in a framework wall, and forming the through tube for aeration in the part of the structural plywood for a floor line configuration which stands face to face against this clearance is indicated.

[0006]

[Problem(s) to be Solved by the Invention] However, it sets to JP,5-5331,A and JP,5-280110,A. Since substrate structural plywood was stuck and the air hole is prepared, in order to have a steam emission rate in a wall in practical use level for the time and effort and cost not only to increase, but A remarkable air hole area was needed, and when the air hole area was too large and the corbel for aeration was furring strip material which consists of Aphananthe aspera material, there was a trouble of falling, the reinforcement, i.e., the wall scale factor, as the outer wall structure. And it was the most difficult work to raise the steam emission rate in a wall even to practical use level, to prevent dew condensation in this way, and to maintain moreover, the reinforcement, i.e., the wall scale factor, as the outer wall structure.

[0007] Moreover, exclude boards and structural plywood and the direct waterproofing moisture-permeable plastic sheet 54 is stuck on the door post (stud) 52 of said framework wall 51 just because

it thinks dew condensation prevention as important. Although to attach the corbel 55 for aeration in the door post 52 of said framework wall 51 from on this waterproofing moisture-permeable plastic sheet 54, and to stick the outer wall panel 56 on this corbel 55 for aeration was also tried In the case of furring strip material which the corbel 55 for aeration turns into from the *Aphananthe aspera* material, when it fell like the above, the reinforcement, i.e., the wall scale factor, as the outer wall structure, and external force was especially added in an earthquake etc., the corbel 55 for aeration broke, or it deformed, and was divided in the joint of the outer wall panel 56, and there was a possibility that omission etc. might occur.

[0008] On the other hand, since it had structure which prepared the through tube for aeration in the structural plywood for floor lines through the spacer in JP,7-13918,U, the air conditioning effectiveness also fell that a clearance wind tends to go into an interior-of-a-room side from an under floor, and the trouble was in comfort of living.

[0009] This invention is made in view of the situation mentioned above, enlarges the steam emission rate in a wall, it raises the dew condensation prevention effectiveness, moreover is excellent in reinforcement, holds the airtightness by the side of the interior of a room, and makes it a technical problem to offer the outer wall structure which aimed at reduction of cost further.

[0010]

[Means for Solving the Problem] This invention according to claim 1 made in order to solve the above-mentioned technical problem Are the outer wall structure by the framework wall method of construction which gave the aeration method of structure, and a waterproofing moisture-permeable plastic sheet is stuck on the outside of said framework wall. The corbel for aeration of the predetermined magnitude which consists of a woody laminated wood obtained from on this waterproofing moisture-permeable plastic sheet by carrying out laminating adhesion of the woody veneer by the door post of said framework wall is attached. It is characterized by an outer wall panel being stuck on this corbel for aeration, and coming to prepare an aeration way between this outer wall panel and said waterproofing moisture-permeable plastic sheet.

[0011] Since sheetings, such as boards and structural plywood, can be excluded from this configuration, the moisture permeation resistance by this is lost, the steam emission rate in a wall becomes large, and it becomes possible to pass a waterproofing moisture-permeable plastic sheet and to emit the steam in a wall to the outdoors easily and certainly. Therefore, the endurance of framework material and adiabatic [of a heat insulator] become what was excellent much more by desiccation in a wall besides the dew condensation prevention effectiveness in a wall. Moreover, since the corbel for aeration is not the *Aphananthe aspera* material but a woody laminated wood, compared with the *Aphananthe aspera* material, neither deviation nor a crack can produce the woody laminated wood easily, and it excels in nail holding power or the shearing force of **, and since it becomes possible to acquire the outer wall structure as a result where a wall scale factor is big, the fall of the reinforcement by excluding a sheeting can be enough compensated with a woody laminated wood, and the outer wall structure excellent in reinforcement can be acquired. Moreover, since deformation of the corbel for aeration is suppressed, generating of the crack of surface-finish material etc. can be effectively prevented to the joint of an outer wall panel. Moreover, by excluding a sheeting, it becomes possible to make thin wall thickness of the part and outer wall structure, and lightweight-ization can be attained. Moreover, since components mark and a routing decrease, reduction of cost can be aimed at more. Moreover, the airtightness by the side of the interior of a room is held, and fall prevention of the air conditioning effectiveness can be aimed at.

[0012] This invention according to claim 2 is characterized by being the plywood which said woody laminated wood according to claim 1 made the grain direction of said woody veneer intersect perpendicularly mutually, and carried out two or more sheet laminating adhesion.

[0013] Since the woody laminated wood used as said corbel for aeration is making the grain direction of the woody veneer intersect perpendicularly mutually from this configuration, it becomes that by which ABARE and deviation accompanying water content fluctuation of the corbel for aeration were stabilized fewer, and much more improvement in wall reinforcement can be aimed at.

[0014] It is characterized by being the parallel plywood with which at least one sheet made other woody veneer layers and the grain direction of said woody veneer cross at right angles among the woody veneers which this invention according to claim 3 is the parallel plywood which said woody

laminated wood according to claim 1 paralleled the grain direction of said woody veneer mutually, and carried out two or more sheet laminating adhesion, and constitute this parallel plywood.

[0015] Since there is a woody veneer layer which made other woody veneer layers and a grain direction cross at right angles from this configuration compared with a woody laminated wood with all woody parallel veneer layers, it becomes that by which ABARE and deviation accompanying water content fluctuation of the corbel for aeration were stabilized fewer, and much more improvement in wall reinforcement can be aimed at.

[0016] This invention according to claim 4 is characterized by the thickness of said woody laminated wood according to claim 2 or 3 being 7-30mm.

[0017] By setting thickness of a woody laminated wood to 7mm or more, the reinforcement of a ***** sake can be obtained much more certainly, the reinforcement, i.e., the wall scale factor, as outer wall structure, and lightweight-ization of outer wall structure can be obtained from this configuration much more effectively by setting thickness of a woody laminated wood to 30mm or less.

[0018] The part or all the door posts in the door post which opens predetermined spacing in said framework wall of a publication, and is prepared in it 4 either install two or more, and it is constituted. this invention according to claim 5 -- claim 1 thru/or a claim -- Said corbel for aeration is attached so that this each door post constituted by installing two or more may be straddled, and it is characterized by sticking said outer wall panel so that the joint may be located within the limits of the width of face of said corbel for aeration.

[0019] Since the part or all the door posts in a door post install two or more and consist of these configurations, reinforcement improves, and moreover, since it is attached in this each door post constituted by installing two or more so that said corbel for aeration may straddle each door post Since each door post is unified, and said outer wall panel is stuck so that the joint may be located within the limits of the width of face of said corbel for aeration A motion of each door post will be effectively controlled by the outer wall panel, and the reinforcement for maintaining, the reinforcement, i.e., the wall scale factor, as outer wall structure, can be obtained much more certainly by it. Moreover, generating of the crack of the surface-finish material of the joint of an outer wall panel, omission, etc. can be effectively prevented by controlling a motion of each door post effectively.

[0020]

[Embodiment of the Invention] A drawing explains the gestalt of operation of the outer wall structure which starts this invention below to a detail. the part drawing 1 indicates the gestalt of 1 operation of the outer wall structure of this invention to be -- a notching front view and drawing 2 are the A-A line sectional views of drawing 1.

[0021] The corbel 5 for aeration of the predetermined magnitude to which the waterproofing moisture-permeable plastic sheet 3 is stuck on the outdoor side of the framework wall 2, and the outer wall structure 1 as outer wall structure by the framework wall method of construction (two-by-four construction) which gave the aeration method of structure shown in this example becomes the door post (stud) 4 of said framework wall 2 from this waterproofing moisture-permeable plastic sheet 3 from the woody laminated wood obtained by carrying out laminating adhesion of the woody veneer is attached with the nail 6. Furthermore, in this example, the corbel 10 for aeration is attached in the header 7 of the first-floor part of the framework wall 2 and the header 8 of a ground-floor part, and the foundation 9 with the nail 11. The sign 12 shows the outer wall panel, and by the nail 13, it is fixed on the corbels 5 and 10 for aeration, and it is stuck. Between the outer wall panel 12 and said waterproofing moisture-permeable plastic sheet 3, the corbels 5 and 10 for aeration serve as a spacer, and the aeration way 14 is formed. In addition, in the sign 15, a head bond and 18 show a foundation and, as for a cope box and 16, 19 shows the heat insulator, as for a drag flask and 17.

[0022] If it is in the door post 4 prepared in predetermined spacing with said framework wall 2, in this example, two are prepared ... and by turns one two one. Intermittently, the side face was contacted and two door posts 4 were installed for obtaining more certainly the reinforcement for reinforcing immobilization of the joint of the outer wall panel 12, and maintaining, the reinforcement, i.e., the wall scale factor, as outer wall structure. Since the dimension of a door post 4 is scaled by the framework wall method of construction (two-by-four construction), in order to

obtain a size required for maintenance on the strength, it shall make to have carried out to two into two here, and when reinforcement is still more nearly required, you shall be 3 or more than it. Moreover, it shall not necessarily be intermittent and shall be suitably chosen as the part or all the door posts 4 in a door post 4 according to the reinforcement demanded about these. Thus, two or more door posts 4 are installed if needed, and if it joins with a nail etc. from the side face of this door post 4 as door-post 4 comrades are sewn up (not shown), it will become more [in reinforcement] much more certain.

[0023] Said corbel 5 for aeration is the nail 6 (let a nail pitch be 100-300mm pitch.) with a die length of 50-65mm. adhesives -- you may use together -- it is nailed down. Moreover, although attached in the door post (stud) 4 of the framework wall 2, the corbel 5 for aeration is attached so that each door post 4 which the corbel 5 for aeration consisted of by installing two or more may be straddled, when some door posts 4 in a door post 4 carry out two or more (this example 2) side-by-side installation and are constituted as mentioned above. Furthermore, the corbel 5 for aeration is set up according to the gap which forms the aeration way 14 where the magnitude is prepared between said outer wall panels 12 and said waterproofing moisture-permeable plastic sheets 3.

[0024] Said corbel 10 for aeration is the nail 11 (let a nail pitch be 100-300mm pitch.) with a die length of 50-65mm like the corbel 5 for aeration. adhesives -- you may use together -- it is nailed down. Moreover, the corbel 10 for aeration is set up according to the gap which forms the aeration way 14 where the magnitude is prepared between said outer wall panels 12 and said waterproofing moisture-permeable plastic sheets 3.

[0025] This corbel 5 for aeration and the corbel 10 for aeration consist of a woody laminated wood obtained by carrying out laminating adhesion of the woody veneer of predetermined thickness with two or more sheet adhesives as aforementioned. As the woody laminated wood, there are so-called plywood which made the direction of woody fiber of the veneer intersect perpendicularly mutually, and the so-called parallel plywood (LVL) to which the direction of woody fiber of the veneer was paralleled mutually, and there are normal plywood and structural plywood by the waterproof ability of the adhesives for laminatings in a plywood. In addition, as for a plywood, it is optimal to use the structural plywood set to Japanese Agricultural Standards. although a grain direction may be made parallel with all veneers in an parallel plywood on the other hand -- each veneer of the parallel plywood -- cleavage strength becomes it still higher that it is the special parallel plywood which made other veneer layers and the grain direction of at least one veneer cross at right angles inside, and the fixed force of each nail becomes the optimal in increase wall reinforcement. As the example, the thing which made the veneer of a bilayer eye intersect perpendicularly is mentioned from a bilayer eye and a rear face from the front face of an parallel plywood. There shall be odd veneer laminating number of sheets, or there shall be the even aforementioned plywoods and parallel plywoods.

[0026] As mentioned above, compared with the corbel for aeration of the conventional *Aphananthe aspera* material, there is an advantage that that it is as that curvature occurs **** [, and] decreases that the corbel 5 for aeration and the corbels 10 for aeration are woody laminated woods, such as a plywood or an parallel plywood. [swelling with surrounding moisture and surrounding moisture] [contracting conversely] In other words, it becomes that by which whose ABARE and deviation accompanying water content fluctuation decreased more compared with the conventional *Aphananthe aspera* material, and were stabilized. Therefore, the smooth nature of the front face of the corbel 5 for aeration and the corbel 10 for aeration is secured, and since the smooth nature by which the outer wall panel 12 was stabilized, and nail holding power are acquired in case the outer wall panel 12 is fixed with a nail 13, if it is in the corbels 5 and 10 for aeration, it becomes a wall with the strong shear strength within a field. Said outer wall panel 12 is being fixed on a nail or a screw with a die length of about 50mm etc. (you may use together with adhesives). (a pitch is about 100-200mm)

[0027] Moreover, in the corbel 5 for aeration, when the corbel 5 for aeration is attached so that each door post 4 constituted by installing two or more may be straddled, there is an advantage that a motion of the door post 4 by the external force concerning a wall can be stopped effectively. Therefore, a motion and gap of the joint of the outer wall panel 12 stuck on it are inhibited, and generating of the crack of the surface-finish material of the joint of the outer wall panel 12 etc. can

be prevented effectively. Moreover, since a door post 4 can use the corbel 5 for aeration broader than usual in the part installed two or more, it becomes what was further excellent also in wall reinforcement. Moreover, the joint of the outer wall panel 12 will become the thing of the cross direction of the corbel 5 for aeration which was further excellent also in wall reinforcement, if it is made to come in the center mostly (generating of the crack of the surface-finish material of the joint of the outer wall panel 12 etc. is prevented effectively).

[0028] As for the dimension of the corbel 5 for aeration, and the corbel 10 for aeration, it is optimal to set thickness of a woody laminated wood to about 7-30mm. By setting thickness of a woody laminated wood to 7mm or more, the reinforcement of a ***** sake can be obtained now much more certainly, the reinforcement, i.e., the wall scale factor, as outer wall structure. Moreover, lightweight-ization of outer wall structure can be obtained now much more effectively by setting thickness of a woody laminated wood to 30mm or less. On the other hand, when a door post 4 is one part, about about 30-40mm makes a width method good as a dimension corresponding to the width of face of the door post 4. In the case of 2 or two or more parts beyond it, it considers as the width method corresponding to it. For example, in the case of two parts, about 45-80mm makes it good. On the other hand, the die length corresponding to the die-length dimension of the framework wall method-of-construction substrate structure shall be sufficient as a die-length dimension. Although there may be joint of the die-length direction, the direction in 1 through is more the optimal on wall reinforcement. In addition, in the case of the conventional corbel 55 (refer to drawing 3) for aeration which consists of *Aphananthe aspera* material, if the thickness is less than 18mm, the conventional corbel 55 (refer to drawing 3) for aeration will break, or it is easy to produce curvature deviation, and nail holding power declines, therefore wall reinforcement falls. Since the corbel 5 for aeration and the corbel 10 for aeration concerning the outer wall structure of this point this invention consist of a woody laminated wood, even if they are thinner than 18mm, they do not have such a thing.

[0029] The door post 4 which constitutes said framework wall 2, a cope box 15, and drag flask 16 grade may be except these although ingredients, such as ** material, bay hemlock material, spruce material, Japan cedar material, hinoki material, or these laminate lumber, are used. As tree species of the woody laminated wood used for the corbel 5 for aeration, and the corbel 10 for aeration, although lauan, John Cong, meranti, KAPORU, a loon ton, etc. are used, you may be the broad-leaved trees or needle-leaf trees other than these. The thickness of the veneer is not what was restricted to this range, although the about 0.7-3.0mm thing is used. Moreover, the thickness of each veneer may be changed.

[0030] In addition, insect control, preservation from decay, and the ingredient that carried out ant-protection processing may be used as the corbel 5 for aeration, and a corbel 10 for aeration. In this case, the endurance of the corbel 5 for aeration and the corbel 10 for aeration improves further, therefore it is the optimal also in wall reinforcement. What is necessary is just to carry out specified quantity mixing of insect control, preservation from decay, and the anti-ant agent into the adhesives at the time of carrying out laminating adhesion of the woody veneer which constitutes a woody laminated wood, if it is in such insect control, preservation from decay, and processing of ****. Since the amount of mixing has fear that adhesion is poor that what is necessary is just to mix 1 to 2% by the weight ratio to adhesives when it mixes too much not much mostly, cautions are required. For example, the drugs of borax, boric acid, fluoridation soda, HOKISHIMU, fenitrothion, and others can be used as insect control drugs. In the case of borax and boric acid, the amount of drugs osmosis to the veneer should just be 0.2% or more to the all-dry weight of the veneer. In the case of fluoridation soda, it should just be 0.1% or more. Although the usual adhesives for plywoods which consist of urea system resin may be used as adhesives for laminatings, if waterproof ability is taken into consideration, phenol resin adhesive or other water resistant adhesives can be used.

[0031] The framework wall 2 shall be manufactured and constructed by the approach from the former. A foundation 9, a foundation 18, etc. are easy to be the things from the former. Although it lets moisture pass, the waterproofing moisture-permeable plastic sheet 3 does not let moisture pass, and is stuck using the staple etc. As the waterproofing moisture-permeable plastic sheet 3, Du Pont "Tyvek" etc. is often used, for example.

[0032] According to the outer wall structure which starts this invention above, since the conventional sheetings, such as boards and structural plywood, can be excluded, the moisture permeation

resistance by this is lost and the steam emission rate in a wall becomes large. And a waterproofing moisture-permeable plastic sheet can be passed and the steam in a wall can be emitted to the outdoors easily and certainly. Therefore, it can be made what was excellent in the dew condensation prevention effectiveness much more. Moreover, since the corbel 5 for aeration and the corbel 10 for aeration are not *Aphananthe aspera* material like before but woody laminated woods, it excels in nail holding power or the shearing force of ** that it is hard to produce deviation in **, and it becomes possible to acquire the outer wall structure as a result where a wall scale factor is big. Therefore, the fall of the reinforcement by excluding the conventional sheeting can be enough compensated with a woody laminated wood, and the outer wall structure excellent in reinforcement can be acquired. Moreover, since deformation of the corbel 5 for aeration and the corbel 10 for aeration is suppressed, generating of the crack of the surface-finish material of the joint of the outer wall panel 12 etc. can be prevented effectively. Moreover, by excluding the conventional sheeting, it becomes possible to make thin wall thickness of the part outer wall structure, and lightweight-ization can be attained. Moreover, components mark and a routing decrease and reduction of cost can be aimed at. Moreover, since it is not the structure of preparing a through tube for aeration like before and the airtightness by the side of the interior of a room is held, fall prevention of the air conditioning effectiveness can be aimed at.

[0033]

[Example] Next, it proves having outer wall structure which performed the wall breakdown test based on examples 1-4 and the examples 1 and 2 of a comparison, and fully compensated the fall of the reinforcement by the outer wall structure concerning this invention excluding the conventional sheeting with the woody laminated wood, consequently was excellent in reinforcement (the wall scale-factor result of examples 1-4 is compared with the wall scale-factor result of the example 1 of a comparison). Moreover, when the corbel for aeration is not the *Aphananthe aspera* material but a woody laminated wood, it proves having the outer wall structure where a wall scale factor is big (the wall scale-factor result of examples 1-4 is compared with the wall scale-factor result of the example 2 of a comparison).

[Example 1] The outer wall structure of a framework wall method of construction was produced as follows. Hemlock material was used as tree species and the outer wall structure of height of 2730mm which consists of a cope box, a drag flask, and a door post (stud), 1820mm of breadth, and a framework wall method of construction with a thickness of 90mm was produced. The part to which, as for a stud, the joint of an outer wall panel comes was made into 2 piles at 910mm interval, and has arranged one stud to the mid-position. The cope box, the drag flask, and the cross-section dimension of a stud used 40mmx90mm two-by-four material. Next, the waterproofing moisture-permeable plastic sheet was stuck on the external surface side. Then, the corbel for aeration which consists of a woody laminated wood was nailed down as ***** pitch 200mm on the cope box, the drag flask, and the stud with the nail (CN-65) with a die length of 65mm, and the outer wall panel was stuck by ***** pitch 100mm with the nail (CN-50) with a die length of 50mm on it. The part where, as for 7.0mm in thickness and a width method, the dimension of the corbel for aeration made the stud 2 piles set 80mm and the part of one stud to 40mm. Die length was set to 2730mm, respectively. Our company light-weight mortar layer compound plywood "trade name [panel / outer wall]: Lath top 15" was used. Size used 15mm in thickness, 2730mm long, and 910mm of two breadth, having arranged it crosswise. The lath top's lightweight mortar layer used the plywood layer as structural plywood with a thickness of 7.5mm by 7.0mm. The structural plywood of phenolic resin adhesive use was used for the woody laminated wood used for the corbel for aeration. The grain direction of each veneer is made to intersect perpendicularly mutually. Lauan material was used as veneer tree species, and veneer thickness was set to 1.0mm. The number of laminating plies was made into 7 ply equal thickness, and set result thickness to 7.0mm. The structural plywood specification of Japanese Agricultural Standards shall be suited.

[0034] [Example 2] Everything but having set veneer thickness to 2.8mm, having made the veneer thickness configuration into the equal thickness of 11 plies as a woody laminated wood used for the corbel for aeration, and having set result thickness of the corbel for aeration to 30mm produced the outer wall structure of the framework wall method of construction of an example 2 like the example 1.

[0035] [Example 3] Veneer thickness is set to 1.0mm as a woody laminated wood used for the corbel for aeration. As for other veneers of *Perilla frutescens* (L.) Britton var. *crispa* (Thunb.) Decne., the grain direction of each veneer uses the veneer of a bilayer eye as the rectangular veneer mutually from the veneer and rear face of a front face to a bilayer eye at parallel. Everything but the thing which carried out laminating adhesion with the veneer configuration of 7 ply equal thickness and for which it was finished and the special parallel plywood with a thickness of 7.0mm was used produced the outer wall structure of the framework wall method of construction of an example 3 like the example 1.

[0036] [Example 4] Veneer thickness is set to 2.8mm as a woody laminated wood used for the corbel for aeration. As for other veneers of *Perilla frutescens* (L.) Britton var. *crispa* (Thunb.) Decne., the grain direction of each veneer uses the veneer of a bilayer eye as the rectangular veneer mutually from the veneer and rear face of a front face to a bilayer eye at parallel. Everything but the thing which carried out laminating adhesion with the veneer configuration of 11 ply equal thickness and for which it was finished and the special parallel plywood with a thickness of 30.0mm was used produced the outer wall structure of the framework wall method of construction of an example 4 like the example 1.

[0037] [Example 1 of a comparison] On the cope box of the outer wall structure of a framework wall method of construction, the drag flask, and the door post (stud), by 5 ply 9.0mm thickness, two structural plywood with a width of face [of 910mm] and a die length of 2730mm was arranged crosswise, and was stuck. Everything but having attached the corbel for aeration which sticks a waterproofing moisture-permeable plastic sheet on it, and consists of *Aphananthe aspera* material with a thickness of 18mm on it continuously produced the outer wall structure of the example 1 of a comparison like the example 1.

[0038] [Example 2 of a comparison] Everything but having used the corbel for aeration with a thickness of 18mm it is thin from the *Aphananthe aspera* material as a corbel for aeration produced the outer wall structure of the framework wall method of construction of the example 2 of a comparison like the example 1.

[0039] [Wall breakdown test] The outer wall structure of the above-mentioned examples 1-4 and the examples 1 and 2 of a comparison was fixed to the test board with hole down hardware, the shear test within a field was carried out, and the wall scale factor was compared. The experimental approach is a non-loading type and is made into positive/negative alternation repeat force application from a upside cope box section side face. At the time of positive/negative deformation (the apparent shear strain angles 1/450, 1/300, 1/200, 1/150, 1/100, 1/75, and 1/50 radian) Force application was carried out after it made it destroy by monotone force application after performing repeat force application 3 times in the same cycle, and reaching maximum load until the deformation angle of a specimen amounted to 1/30 radians or more. From a trial value, short-term allowable shear force is computed and an apparent wall scale factor is computed.

[0040] [Test result] The result (wall scale factor) of a trial is shown in Table 1.

[Table 1]

実施例 1	実施例 2	実施例 3	実施例 4	比較例 1	比較例 2
5. 8	6. 2	5. 4	5. 9	3. 9	2. 0

[0041]

[Effect of the Invention] According to the outer wall structure which starts this invention as mentioned above, the steam emission rate in a wall can be enlarged, the dew condensation prevention effectiveness can be raised, moreover, it can excel in reinforcement, the airtightness by the side of the interior of a room can be held, and the outer wall structure which aimed at reduction of cost further can be offered.

[Translation done.]

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TECHNICAL FIELD

[Field of the Invention] This invention relates to the outer wall structure which has endurance with a wall scale factor big moreover in the interior of an outer wall about the outer wall structure by the framework wall method of construction which gave the aeration method of structure which prevents that dew condensation occurs.

[0002]

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PRIOR ART

[Description of the Prior Art] As outer wall structure of the conventional wooden residence by the framework wall method of construction (two-by-four construction) which gave the aeration method of structure which prevents that dew condensation occurs inside an outer wall, as shown in drawing 3 On the outdoor side side face of the door post (stud) 52 of the framework wall 51, boards, structural plywood, etc. as a sheeting 53, such as OSB, are stuck. Although it lets moisture pass on it, moisture is covered with the waterproofing moisture-permeable plastic sheet 54 which it does not let pass. From the waterproofing moisture-permeable plastic sheet 54 The corbel 55 for aeration which consists of Aphananthe aspera material is attached, the outer wall panels 56, such as siding, are stuck on this corbel 55 for aeration, and the structure which formed the aeration way 57 between this outer wall panel 56 and said waterproofing moisture-permeable plastic sheet 54 is known.

[0003] However, with such outer wall structure, since moisture permeation resistance of the sheetings 53, such as boards and structural plywood, was strong, the emission rate of the steam in a wall was slow, and, for this reason, the trouble that there was fear of dew condensation occurring or wall structural members, such as framework material, dilapidating for moisture was in the wall.

[0004] Then, in JP,5-5331,A and JP,5-280110,A, the thing of substrate structural plywood for which an air hole is suitably prepared in a part, moisture is emitted, and generating of dew condensation is prevented is indicated in order to solve this.

[0005] Moreover, according to JP,7-13918,U, wall surface substrate material being attached in the interior-of-a-room side of the perpendicular member of a framework wall through a spacer, forming the clearance for aeration between an outer wall sheeting and the interior-of-a-room side side face of the horizontal bracing in a framework wall, and forming the through tube for aeration in the part of the structural plywood for a floor line configuration which stands face to face against this clearance is indicated.

[0006]

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EFFECT OF THE INVENTION

[Effect of the Invention] According to the outer wall structure which starts this invention as mentioned above, the steam emission rate in a wall can be enlarged, the dew condensation prevention effectiveness can be raised, moreover, it can excel in reinforcement, the airtightness by the side of the interior of a room can be held, and the outer wall structure which aimed at reduction of cost further can be offered.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] However, it sets to JP,5-5331,A and JP,5-280110,A. Since substrate structural plywood was stuck and the air hole is prepared, in order to have a steam emission rate in a wall in practical use level for the time and effort and cost not only to increase, but A remarkable air hole area was needed, and when the air hole area was too large and the corbel for aeration was furring strip material which consists of Aphananthe aspera material, there was a trouble of falling, the reinforcement, i.e., the wall scale factor, as the outer wall structure. And it was the most difficult work to raise the steam emission rate in a wall even to practical use level, to prevent dew condensation in this way, and to maintain moreover, the reinforcement, i.e., the wall scale factor, as the outer wall structure.

[0007] Moreover, exclude boards and structural plywood and the direct waterproofing moisture-permeable plastic sheet 54 is stuck on the door post (stud) 52 of said framework wall 51 just because it thinks dew condensation prevention as important. Although to attach the corbel 55 for aeration in the door post 52 of said framework wall 51 from on this waterproofing moisture-permeable plastic sheet 54, and to stick the outer wall panel 56 on this corbel 55 for aeration was also tried In the case of furring strip material which the corbel 55 for aeration turns into from the Aphananthe aspera material, when it fell like the above, the reinforcement, i.e., the wall scale factor, as the outer wall structure, and external force was especially added in an earthquake etc., the corbel 55 for aeration broke, or it deformed, and was divided in the joint of the outer wall panel 56, and there was a possibility that omission etc. might occur.

[0008] On the other hand, since it had structure which prepared the through tube for aeration in the structural plywood for floor lines through the spacer in JP,7-13918,U, the air conditioning effectiveness also fell that a clearance wind tends to go into an interior-of-a-room side from an under floor, and the trouble was in comfort of living.

[0009] This invention is made in view of the situation mentioned above, enlarges the steam emission rate in a wall, it raises the dew condensation prevention effectiveness, moreover is excellent in reinforcement, holds the airtightness by the side of the interior of a room, and makes it a technical problem to offer the outer wall structure which aimed at reduction of cost further.

[0010]

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MEANS

[Means for Solving the Problem] This invention according to claim 1 made in order to solve the above-mentioned technical problem Are the outer wall structure by the framework wall method of construction which gave the aeration method of structure, and a waterproofing moisture-permeable plastic sheet is stuck on the outside of said framework wall. The corbel for aeration of the predetermined magnitude which consists of a woody laminated wood obtained from on this waterproofing moisture-permeable plastic sheet by carrying out laminating adhesion of the woody veneer by the door post of said framework wall is attached. It is characterized by an outer wall panel being stuck on this corbel for aeration, and coming to prepare an aeration way between this outer wall panel and said waterproofing moisture-permeable plastic sheet.

[0011] Since sheetings, such as boards and structural plywood, can be excluded from this configuration, the moisture permeation resistance by this is lost, the steam emission rate in a wall becomes large, and it becomes possible to pass a waterproofing moisture-permeable plastic sheet and to emit the steam in a wall to the outdoors easily and certainly. Therefore, the endurance of framework material and adiathermic [of a heat insulator] become what was excellent much more by desiccation in a wall besides the dew condensation prevention effectiveness in a wall. Moreover, since the corbel for aeration is not the Aphananthe aspera material but a woody laminated wood, compared with the Aphananthe aspera material, neither deviation nor a crack can produce the woody laminated wood easily, and it excels in nail holding power or the shearing force of **, and since it becomes possible to acquire the outer wall structure as a result where a wall scale factor is big, the fall of the reinforcement by excluding a sheeting can be enough compensated with a woody laminated wood, and the outer wall structure excellent in reinforcement can be acquired. Moreover, since deformation of the corbel for aeration is suppressed, generating of the crack of surface-finish material etc. can be effectively prevented to the joint of an outer wall panel. Moreover, by excluding a sheeting, it becomes possible to make thin wall thickness of the part and outer wall structure, and lightweight-ization can be attained. Moreover, since components mark and a routing decrease, reduction of cost can be aimed at more. Moreover, the airtightness by the side of the interior of a room is held, and fall prevention of the air conditioning effectiveness can be aimed at.

[0012] This invention according to claim 2 is characterized by being the plywood which said woody laminated wood according to claim 1 made the grain direction of said woody veneer intersect perpendicularly mutually, and carried out two or more sheet laminating adhesion.

[0013] Since the woody laminated wood used as said corbel for aeration is making the grain direction of the woody veneer intersect perpendicularly mutually from this configuration, it becomes that by which ABARE and deviation accompanying water content fluctuation of the corbel for aeration were stabilized fewer, and much more improvement in wall reinforcement can be aimed at.

[0014] It is characterized by being the parallel plywood with which at least one sheet made other woody veneer layers and the grain direction of said woody veneer cross at right angles among the woody veneers which this invention according to claim 3 is the parallel plywood which said woody laminated wood according to claim 1 paralleled the grain direction of said woody veneer mutually, and carried out two or more sheet laminating adhesion, and constitute this parallel plywood.

[0015] Since there is a woody veneer layer which made other woody veneer layers and a grain direction cross at right angles from this configuration compared with a woody laminated wood with all woody parallel veneer layers, it becomes that by which ABARE and deviation accompanying

water content fluctuation of the corbel for aeration were stabilized fewer, and much more improvement in wall reinforcement can be aimed at.

[0016] This invention according to claim 4 is characterized by the thickness of said woody laminated wood according to claim 2 or 3 being 7-30mm.

[0017] By setting thickness of a woody laminated wood to 7mm or more, the reinforcement of a ***** sake can be obtained much more certainly, the reinforcement, i.e., the wall scale factor, as outer wall structure, and lightweight-ization of outer wall structure can be obtained from this configuration much more effectively by setting thickness of a woody laminated wood to 30mm or less.

[0018] The part or all the door posts in the door post which opens predetermined spacing in said framework wall of a publication, and is prepared in it 4 either install two or more, and it is constituted. this invention according to claim 5 -- claim 1 thru/or a claim -- Said corbel for aeration is attached so that this each door post constituted by installing two or more may be straddled, and it is characterized by sticking said outer wall panel so that the joint may be located within the limits of the width of face of said corbel for aeration.

[0019] Since the part or all the door posts in a door post install two or more and consist of these configurations, reinforcement improves, and moreover, since it is attached in this each door post constituted by installing two or more so that said corbel for aeration may straddle each door post Since each door post is unified, and said outer wall panel is stuck so that the joint may be located within the limits of the width of face of said corbel for aeration A motion of each door post will be effectively controlled by the outer wall panel, and the reinforcement for maintaining, the reinforcement, i.e., the wall scale factor, as outer wall structure, can be obtained much more certainly by it. Moreover, generating of the crack of the surface-finish material of the joint of an outer wall panel, omission, etc. can be effectively prevented by controlling a motion of each door post effectively.

[0020]

[Embodiment of the Invention] A drawing explains the gestalt of operation of the outer wall structure which starts this invention below to a detail. the part drawing 1 indicates the gestalt of 1 operation of the outer wall structure of this invention to be -- a notching front view and drawing 2 are the A-A line sectional views of drawing 1.

[0021] The corbel 5 for aeration of the predetermined magnitude to which the waterproofing moisture-permeable plastic sheet 3 is stuck on the outdoor side of the framework wall 2, and the outer wall structure 1 as outer wall structure by the framework wall method of construction (two-by-four construction) which gave the aeration method of structure shown in this example becomes the door post (stud) 4 of said framework wall 2 from this waterproofing moisture-permeable plastic sheet 3 from the woody laminated wood obtained by carrying out laminating adhesion of the woody veneer is attached with the nail 6. Furthermore, in this example, the corbel 10 for aeration is attached in the header 7 of the first-floor part of the framework wall 2 and the header 8 of a ground-floor part, and the foundation 9 with the nail 11. The sign 12 shows the outer wall panel, and by the nail 13, it is fixed on the corbels 5 and 10 for aeration, and it is stuck. Between the outer wall panel 12 and said waterproofing moisture-permeable plastic sheet 3, the corbels 5 and 10 for aeration serve as a spacer, and the aeration way 14 is formed. In addition, in the sign 15, a head bond and 18 show a foundation and, as for a cope box and 16, 19 shows the heat insulator, as for a drag flask and 17.

[0022] If it is in the door post 4 prepared in predetermined spacing with said framework wall 2, in this example, two are prepared ... and by turns one two one. Intermittently, the side face was contacted and two door posts 4 were installed for obtaining more certainly the reinforcement for reinforcing immobilization of the joint of the outer wall panel 12, and maintaining, the reinforcement, i.e., the wall scale factor, as outer wall structure. Since the dimension of a door post 4 is scaled by the framework wall method of construction (two-by-four construction), in order to obtain a size required for maintenance on the strength, it shall make to have carried out to two into two here, and when reinforcement is still more nearly required, you shall be 3 or more than it. Moreover, it shall not necessarily be intermittent and shall be suitably chosen as the part or all the door posts 4 in a door post 4 according to the reinforcement demanded about these. Thus, two or more door posts 4 are installed if needed, and if it joins with a nail etc. from the side face of this door

post 4 as door-post 4 comrades are sewn up (not shown), it will become more [in reinforcement] much more certain.

[0023] Said corbel 5 for aeration is the nail 6 (let a nail pitch be 100-300mm pitch.) with a die length of 50-65mm. adhesives -- you may use together -- it is nailed down. Moreover, although attached in the door post (stud) 4 of the framework wall 2, the corbel 5 for aeration is attached so that each door post 4 which the corbel 5 for aeration consisted of by installing two or more may be straddled, when some door posts 4 in a door post 4 carry out two or more (this example 2) side-by-side installation and are constituted as mentioned above. Furthermore, the corbel 5 for aeration is set up according to the gap which forms the aeration way 14 where the magnitude is prepared between said outer wall panels 12 and said waterproofing moisture-permeable plastic sheets 3.

[0024] Said corbel 10 for aeration is the nail 11 (let a nail pitch be 100-300mm pitch.) with a die length of 50-65mm like the corbel 5 for aeration. adhesives -- you may use together -- it is nailed down. Moreover, the corbel 10 for aeration is set up according to the gap which forms the aeration way 14 where the magnitude is prepared between said outer wall panels 12 and said waterproofing moisture-permeable plastic sheets 3.

[0025] This corbel 5 for aeration and the corbel 10 for aeration consist of a woody laminated wood obtained by carrying out laminating adhesion of the woody veneer of predetermined thickness with two or more sheet adhesives as aforementioned. As the woody laminated wood, there are so-called plywood which made the direction of woody fiber of the veneer intersect perpendicularly mutually, and the so-called parallel plywood (LVL) to which the direction of woody fiber of the veneer was paralleled mutually, and there are normal plywood and structural plywood by the waterproof ability of the adhesives for laminatings in a plywood. In addition, as for a plywood, it is optimal to use the structural plywood set to Japanese Agricultural Standards. although a grain direction may be made parallel with all veneers in an parallel plywood on the other hand -- each veneer of the parallel plywood -- cleavage strength becomes it still higher that it is the special parallel plywood which made other veneer layers and the grain direction of at least one veneer cross at right angles inside, and the fixed force of each nail becomes the optimal in increase wall reinforcement. As the example, the thing which made the veneer of a bilayer eye intersect perpendicularly is mentioned from a bilayer eye and a rear face from the front face of an parallel plywood. There shall be odd veneer laminating number of sheets, or there shall be the even aforementioned plywoods and parallel plywoods.

[0026] As mentioned above, compared with the corbel for aeration of the conventional *Aphananthe aspera* material, there is an advantage that that it is as that curvature occurs **** [, and] decreases that the corbel 5 for aeration and the corbels 10 for aeration are woody laminated woods, such as a plywood or an parallel plywood. [swelling with surrounding moisture and surrounding moisture] [contracting conversely] In other words, it becomes that by which whose ABARE and deviation accompanying water content fluctuation decreased more compared with the conventional *Aphananthe aspera* material, and were stabilized. Therefore, the smooth nature of the front face of the corbel 5 for aeration and the corbel 10 for aeration is secured, and since the smooth nature by which the outer wall panel 12 was stabilized, and nail holding power are acquired in case the outer wall panel 12 is fixed with a nail 13, if it is in the corbels 5 and 10 for aeration, it becomes a wall with the strong shear strength within a field. Said outer wall panel 12 is being fixed on a nail or a screw with a die length of about 50mm etc. (you may use together with adhesives). (a pitch is about 100-200mm)

[0027] Moreover, in the corbel 5 for aeration, when the corbel 5 for aeration is attached so that each door post 4 constituted by installing two or more may be straddled, there is an advantage that a motion of the door post 4 by the external force concerning a wall can be stopped effectively. Therefore, a motion and gap of the joint of the outer wall panel 12 stuck on it are inhibited, and generating of the crack of the surface-finish material of the joint of the outer wall panel 12 etc. can be prevented effectively. Moreover, since a door post 4 can use the corbel 5 for aeration broader than usual in the part installed two or more, it becomes what was further excellent also in wall reinforcement. Moreover, the joint of the outer wall panel 12 will become the thing of the cross direction of the corbel 5 for aeration which was further excellent also in wall reinforcement, if it is made to come in the center mostly (generating of the crack of the surface-finish material of the joint

of the outer wall panel 12 etc. is prevented effectively).

[0028] As for the dimension of the corbel 5 for aeration, and the corbel 10 for aeration, it is optimal to set thickness of a woody laminated wood to about 7-30mm. By setting thickness of a woody laminated wood to 7mm or more, the reinforcement of a ***** sake can be obtained now much more certainly, the reinforcement, i.e., the wall scale factor, as outer wall structure. Moreover, lightweight-ization of outer wall structure can be obtained now much more effectively by setting thickness of a woody laminated wood to 30mm or less. On the other hand, when a door post 4 is one part, about about 30-40mm makes a width method good as a dimension corresponding to the width of face of the door post 4. In the case of 2 or two or more parts beyond it, it considers as the width method corresponding to it. For example, in the case of two parts, about 45-80mm makes it good. On the other hand, the die length corresponding to the die-length dimension of the framework wall method-of-construction substrate structure shall be sufficient as a die-length dimension. Although there may be joint of the die-length direction, the direction in 1 through is more the optimal on wall reinforcement. In addition, in the case of the conventional corbel 55 (refer to drawing 3) for aeration which consists of Aphananthe aspera material, if the thickness is less than 18mm, the conventional corbel 55 (refer to drawing 3) for aeration will break, or it is easy to produce curvature deviation, and nail holding power declines, therefore wall reinforcement falls. Since the corbel 5 for aeration and the corbel 10 for aeration concerning the outer wall structure of this point this invention consist of a woody laminated wood, even if they are thinner than 18mm, they do not have such a thing.

[0029] The door post 4 which constitutes said framework wall 2, a cope box 15, and drag flask 16 grade may be except these although ingredients, such as ** material, bay hemlock material, spruce material, Japan cedar material, hinoki material, or these laminate lumber, are used. As tree species of the woody laminated wood used for the corbel 5 for aeration, and the corbel 10 for aeration, although lauan, John Cong, meranti, KAPORU, a loon ton, etc. are used, you may be the broad-leaved trees or needle-leaf trees other than these. The thickness of the veneer is not what was restricted to this range, although the about 0.7-3.0mm thing is used. Moreover, the thickness of each veneer may be changed.

[0030] In addition, insect control, preservation from decay, and the ingredient that carried out ant-protection processing may be used as the corbel 5 for aeration, and a corbel 10 for aeration. In this case, the endurance of the corbel 5 for aeration and the corbel 10 for aeration improves further, therefore it is the optimal also in wall reinforcement. What is necessary is just to carry out specified quantity mixing of insect control, preservation from decay, and the anti-ant agent into the adhesives at the time of carrying out laminating adhesion of the woody veneer which constitutes a woody laminated wood, if it is in such insect control, preservation from decay, and processing of ****. Since the amount of mixing has fear that adhesion is poor that what is necessary is just to mix 1 to 2% by the weight ratio to adhesives when it mixes too much not much mostly, cautions are required. For example, the drugs of borax, boric acid, fluoridation soda, HOKISHIMU, fenitrothion, and others can be used as insect control drugs. In the case of borax and boric acid, the amount of drugs osmosis to the veneer should just be 0.2% or more to the all-dry weight of the veneer. In the case of fluoridation soda, it should just be 0.1% or more. Although the usual adhesives for plywoods which consist of urea system resin may be used as adhesives for laminatings, if waterproof ability is taken into consideration, phenol resin adhesive or other water resistant adhesives can be used.

[0031] The framework wall 2 shall be manufactured and constructed by the approach from the former. A foundation 9, a foundation 18, etc. are easy to be the things from the former. Although it lets moisture pass, the waterproofing moisture-permeable plastic sheet 3 does not let moisture pass, and is stuck using the staple etc. As the waterproofing moisture-permeable plastic sheet 3, Du Pont "Tyvek" etc. is often used, for example.

[0032] According to the outer wall structure which starts this invention above, since the conventional sheetings, such as boards and structural plywood, can be excluded, the moisture permeation resistance by this is lost and the steam emission rate in a wall becomes large. And a waterproofing moisture-permeable plastic sheet can be passed and the steam in a wall can be emitted to the outdoors easily and certainly. Therefore, it can be made what was excellent in the dew condensation prevention effectiveness much more. Moreover, since the corbel 5 for aeration and the corbel 10 for aeration are not Aphananthe aspera material like before but woody laminated woods, it excels in nail

holding power or the shearing force of ** that it is hard to produce deviation in **, and it becomes possible to acquire the outer wall structure as a result where a wall scale factor is big. Therefore, the fall of the reinforcement by excluding the conventional sheeting can be enough compensated with a woody laminated wood, and the outer wall structure excellent in reinforcement can be acquired. Moreover, since deformation of the corbel 5 for aeration and the corbel 10 for aeration is suppressed, generating of the crack of the surface-finish material of the joint of the outer wall panel 12 etc. can be prevented effectively. Moreover, by excluding the conventional sheeting, it becomes possible to make thin wall thickness of the part outer wall structure, and lightweight-ization can be attained. Moreover, components mark and a routing decrease and reduction of cost can be aimed at. Moreover, since it is not the structure of preparing a through tube for aeration like before and the airtightness by the side of the interior of a room is held, fall prevention of the air conditioning effectiveness can be aimed at.

[0033]

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EXAMPLE

[Example] Next, it proves having outer wall structure which performed the wall breakdown test based on examples 1-4 and the examples 1 and 2 of a comparison, and fully compensated the fall of the reinforcement by the outer wall structure concerning this invention excluding the conventional sheeting with the woody laminated wood, consequently was excellent in reinforcement (the wall scale-factor result of examples 1-4 is compared with the wall scale-factor result of the example 1 of a comparison). Moreover, when the corbel for aeration is not the *Aphananthe aspera* material but a woody laminated wood, it proves having the outer wall structure where a wall scale factor is big (the wall scale-factor result of examples 1-4 is compared with the wall scale-factor result of the example 2 of a comparison).

[Example 1] The outer wall structure of a framework wall method of construction was produced as follows. Hemlock material was used as tree species and the outer wall structure of height of 2730mm which consists of a cope box, a drag flask, and a door post (stud), 1820mm of breadth, and a framework wall method of construction with a thickness of 90mm was produced. The part to which, as for a stud, the joint of an outer wall panel comes was made into 2 piles at 910mm interval, and has arranged one stud to the mid-position. The cope box, the drag flask, and the cross-section dimension of a stud used 40mmx90mm two-by-four material. Next, the waterproofing moisture-permeable plastic sheet was stuck on the external surface side. Then, the corbel for aeration which consists of a woody laminated wood was nailed down as ***** pitch 200mm on the cope box, the drag flask, and the stud with the nail (CN-65) with a die length of 65mm, and the outer wall panel was stuck by ***** pitch 100mm with the nail (CN-50) with a die length of 50mm on it. The part where, as for 7.0mm in thickness and a width method, the dimension of the corbel for aeration made the stud 2 piles set 80mm and the part of one stud to 40mm. Die length was set to 2730mm, respectively. Our company light-weight mortar layer compound plywood "trade name [panel / outer wall]: Lath top 15" was used. Size used 15mm in thickness, 2730mm long, and 910mm of two breadth, having arranged it crosswise. The lath top's lightweight mortar layer used the plywood layer as structural plywood with a thickness of 7.5mm by 7.0mm. The structural plywood of phenolic resin adhesive use was used for the woody laminated wood used for the corbel for aeration. The grain direction of each veneer is made to intersect perpendicularly mutually. Lauan material was used as veneer tree species, and veneer thickness was set to 1.0mm. The number of laminating plies was made into 7 ply equal thickness, and set result thickness to 7.0mm. The structural plywood specification of Japanese Agricultural Standards shall be suited.

[0034] [Example 2] Everything but having set veneer thickness to 2.8mm, having made the veneer thickness configuration into the equal thickness of 11 plies as a woody laminated wood used for the corbel for aeration, and having set result thickness of the corbel for aeration to 30mm produced the outer wall structure of the framework wall method of construction of an example 2 like the example 1.

[0035] [Example 3] Veneer thickness is set to 1.0mm as a woody laminated wood used for the corbel for aeration. As for other veneers of *Perilla frutescens* (L.) Britton var. *crispa* (Thunb.) Decne., the grain direction of each veneer uses the veneer of a bilayer eye as the rectangular veneer mutually from the veneer and rear face of a front face to a bilayer eye at parallel. Everything but the thing which carried out laminating adhesion with the veneer configuration of 7 ply equal thickness and for which it was finished and the special parallel plywood with a thickness of 7.0mm was used produced

the outer wall structure of the framework wall method of construction of an example 3 like the example 1.

[0036] [Example 4] Veneer thickness is set to 2.8mm as a woody laminated wood used for the corbel for aeration. As for other veneers of *Perilla frutescens* (L.) Britton var. *crispa* (Thunb.) Decne., the grain direction of each veneer uses the veneer of a bilayer eye as the rectangular veneer mutually from the veneer and rear face of a front face to a bilayer eye at parallel. Everything but the thing which carried out laminating adhesion with the veneer configuration of 11 ply equal thickness and for which it was finished and the special parallel plywood with a thickness of 30.0mm was used produced the outer wall structure of the framework wall method of construction of an example 4 like the example 1.

[0037] [Example 1 of a comparison] On the cope box of the outer wall structure of a framework wall method of construction, the drag flask, and the door post (stud), by 5 ply 9.0mm thickness, two structural plywood with a width of face [of 910mm] and a die length of 2730mm was arranged crosswise, and was stuck. Everything but having attached the corbel for aeration which sticks a waterproofing moisture-permeable plastic sheet on it, and consists of *Aphananthe aspera* material with a thickness of 18mm on it continuously produced the outer wall structure of the example 1 of a comparison like the example 1.

[0038] [Example 2 of a comparison] Everything but having used the corbel for aeration with a thickness of 18mm it is thin from the *Aphananthe aspera* material as a corbel for aeration produced the outer wall structure of the framework wall method of construction of the example 2 of a comparison like the example 1.

[0039] [Wall breakdown test] The outer wall structure of the above-mentioned examples 1-4 and the examples 1 and 2 of a comparison was fixed to the test board with hole down hardware, the shear test within a field was carried out, and the wall scale factor was compared. The experimental approach is a non-loading type and is made into positive/negative alternation repeat force application from a upside cope box section side face. At the time of positive/negative deformation (the apparent shear strain angles 1/450, 1/300, 1/200, 1/150, 1/100, 1/75, and 1/50 radian) Force application was carried out after it made it destroy by monotone force application after performing repeat force application 3 times in the same cycle, and reaching maximum load until the deformation angle of a specimen amounted to 1/30 radians or more. From a trial value, short-term allowable shear force is computed and an apparent wall scale factor is computed.

[0040] [Test result] The result (wall scale factor) of a trial is shown in Table 1.

[Table 1]

実施例 1	実施例 2	実施例 3	実施例 4	比較例 1	比較例 2
5. 8	6. 2	5. 4	5. 9	3. 9	2. 0

[0041]

[Translation done.]

* NOTICES *

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1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] the gestalt of 1 operation of the outer wall structure of this invention is shown -- it is a notching front view a part.

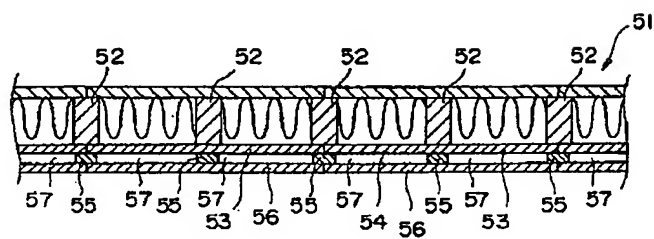
[Drawing 2] It is the A-A line sectional view of drawing 1.

[Drawing 3] It is the sectional view showing the outer wall structure for aeration methods of structure in the framework wall method of construction of the conventional example.

[Description of Notations]

- 1 Outer Wall Structure
- 2 Framework Wall
- 3 Waterproofing Moisture-permeable Plastic Sheet
- 4 Door Post (Stud)
- 5 Ten Corbel for aeration
- 6, 11, 13 Nail
- 7 Eight Header
- 9 Foundation
- 12 Outer Wall Panel
- 14 Aeration Way
- 15 Cope Box
- 16 Drag Flask
- 17 Head Bond
- 18 Foundation
- 19 Heat Insulator
- 51 Framework Wall
- 52 Door Post (Stud)
- 53 Sheeting
- 54 Waterproofing Moisture-permeable Plastic Sheet
- 55 Corbel for Aeration
- 56 Outer Wall Panel
- 57 Aeration Way

[Translation done.]



[Translation done.]